

# HEAT TREATMENT IMPORTANT IN MOTOR CAR MANUFACTURE

Long Life of Steel Parts Is Insured by Carbonizing Process.

By C. C. BINKLEY,  
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One of the most important but least understood processes connected with the manufacture of the modern motor car, is the science of heat treatment. It is an old axiom that "No motor car is stronger than its weakest point." The motor is the heart of the car and by that motor, the manufacturer's reputation must stand or fall.

The heat treating department stands out as the manufacturers chief insurance against weak, faulty parts in motor or chassis. In the Chalmers plant, for instance, every part that is subjected to severe strain must run the gauntlet of thirty furnaces in the heat treating department before it is ready for use. Among the parts treated in this department are steering arms, crankshafts, connecting rods, camshafts and gears.

The camshaft, which must undergo a great share of the motor strain, is first packed in a gas pipe about three inches in diameter. A carbonizing compound is then poured into the pipe and tamped lightly about the camshaft. After the camshaft is packed snugly away in its steel container the ends are securely plugged with fire clay and the camshaft is ready for the carbonizing furnace.

When the furnace has been stacked high with camshafts the doors are closed and the fire is turned on.

**Terrific Heat Applied.**

The heat generated in the carbonizing furnaces ranges from 1,650 to 1,700 degrees Fahrenheit and is regulated from a central control presided over by a tender whose sole business it is to keep tab on the temperature and timing. Each job which goes into the fires is registered on a separate card which gives the tender a check on all work in process. Over each furnace is a combination light indicator with three colored lenses—blue, green and red. When the blue light shows the temperature is too low and more heat is applied. When the red light shows it is a danger signal, indicating that the heat is too intense. The ideal temperature is indicated by the display of a green light. When all three lights are burning the job is done, and ready to come out of the furnace.

**Toughening the Steel.**

During the process of carbonizing a change takes place in the texture of the steel. In direct ratio to the length of time spent in the furnace the carbon compound which surrounds the camshaft penetrates the

surface of the steel. The part which is carbonized is called the case, and is much harder than the core, or interior which has not been reached by the carbon. To carbonize the steel through to the core would mean a weakening of the entire camshaft, because the steel would become brittle and lose its resiliency.

After the carbonizing process, the shaft is ready for its first heat treatment to toughen the core. It is again placed in a furnace, this time without its gas pipe protector. Again the fire is applied and the temperature raised to such a degree that the core is made tougher and more capable of standing severe strains. At the correct time, the red hot shafts are lifted from the fire and shot down an incline that gives them a whirling motion as they plunge into a vat of water. This rotary motion assures that all parts will reach the water at the same time, so that cooling will be even.

**Bath in Boiling Oil.**

A third visit to the furnace follows for the second heat treatment for case hardening and closing the pores. Many makers omit the second treatment entirely, but Chalmers has included it as an extra factor of safety. After the final heating the shaft is again quenched in water.

The last step in the line of heat treating is a bath in boiling oil. This bath is administered to release any strains or tension which the steel might have undergone in previous ordeals by fire. From the oil vats, the camshafts are taken to the sandblast room. Here a surface scale, which has accumulated on the steel, is removed by means of sand driven through a hose under high pressure.

Not until the green camshaft has passed through all these operations is it ready for the lathe work and finer machining operations which render it suitable for installation in the car.

## CONGRESSMEN FAVOR ADAMSON AUTO BILL

Which Provides That Motorist with Home State Number May Travel in Any State.

WASHINGTON, Jan. 29.—Many members of both branches of Congress have unhesitatingly expressed themselves in favor of the Adamson automobile registration bill which provides that a motorist with his home state number can freely travel anywhere in the United States without additional taxation.

The American Automobile Association, state and local clubs throughout the country, in asking the support of their congressmen in Washington, have been gratified at the practical unanimity of the replies received. Typical of these replies are the following:

Representative A. C. Hart, of New Jersey: "I am heartily in sympathy with the Adamson bill and shall support it."

Representative A. G. Dewalt, of Pennsylvania: "I can unhesitatingly say I am for the Adamson bill."

Representative John A. Key, of Ohio: "From what I know of the Adamson bill I can very consistently support it."

"Conscientious and careful consideration," is the phraseology used in scores of letters to American Automobile Association club presidents, both from senators and representatives, and the general sentiment offers a pronounced contrast to the reception accorded the federal registra-

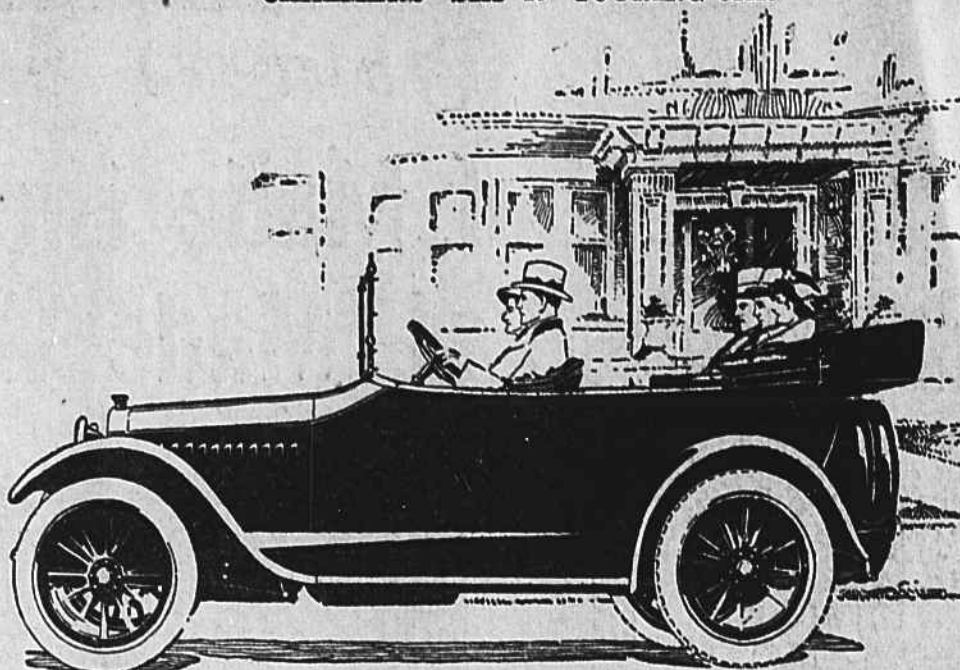
tion bill put forward several years ago by the national automobile organization, of which William H. Hotchkiss was then the president.

Commenting upon the change of public opinion, President John A. Wilson says: "Of course the fact alone that the American Automobile Association now speaks in organized form for over two and a quarter million road users, with another million in sight before the close of the present year, as against less than a hundred thousand ten years ago, tells its own story. The self propelled vehicle is an accepted necessity and economically has its place."

"I believe that the time is nearer at hand than most of us realize when Representative Adamson's prophecy will be realized and that it will be only the operator and not the vehicle calling for a number. His number will be displayed on whatever vehicle may be in charge of the operator, who will be subject to an examination sufficient to demonstrate his ability to handle an automobile under diversified traffic conditions."

"In the country districts which are absorbing the greater part of the motor cars now being produced there is a growing dissent at the multiplying increase of vehicle taxation. Some day soon the automobile will be taxed like any other piece of property, for roads confer a general benefit and should be paid for out of general funds."

## CHALMERS "SIX 40" TOURING CAR



Graceful, sweeping body lines, beautiful molded fenders and lustrous coach finish, make this the most distinguished car on the road. The top harmonizes perfectly with the body.

## FUEL ECONOMY IS ONE OF THE CHALMERS AIMS

High Power with Low Gasoline Bills is the Goal of Engineers.

The bogie of a possible gasoline famine is uppermost today in the minds of American motorists. All motorists are waiting expectantly for the results of the investigation now in progress in Washington. The wholesale exportation of gasoline from this country threatens to send the price of automobile fuel soaring to heights never before attained.

Producing high power and high speed at the cost of former low power and low speed today is the bone of most furious engineering contention, according to Paul Smith, vice president of the Chalmers Motor Company, in charge of the selling division.

"Chalmers engineering," declares Mr. Smith, "has succeeded notably in keeping itself from being drawn into the whirlpool of high speed and high power at the cost of operating economy. Our engineers have kept high power and high mileage per gallon of fuel lashed securely together. Chalmers engineers have approached the whole speed and power matter with their eyes everlastingly on economy of operation."

"Against low mileage per gallon of gasoline it is interesting to observe that the Chalmers high speed engines deliver far more mileage in the case of both the six-thirty and six-forty. Our owners tell us that the six-forty delivers from sixteen to eighteen miles per gallon of gasoline while the new six-thirty Chalmers 3,400 revolutions per minute engine gets from eighteen to twenty-one miles out of every gallon of gasoline consumed."

"The new Chalmers high speed power engines in other words attain from forty-five to forty-eight horse power at the former cost of twenty to twenty-five horse power."

"This is especially significant to the purchaser of motor cars in view of the upward trend of gasoline prices. We have applied ourselves intensely in the Chalmers organization to the task of producing high power and high engine speed without jeopardizing for a moment the imperative matter of operating economy."

"We are glad to announce that we have wrung high speed out of our engines and at the same time cut down gasoline consumption one-third. Burn-up twice the necessary amount of gasoline for the sake of power and speed that cannot be used has no place in sensible engineering."

## AVIATION FILLED

Is Secured by Packard Company and It Will Make Aeroplane Motors.

A large tract of land on Lake St. Clair, near Mount Clemens, Mich., has been acquired by the Packard Motor Car Company, as an aviation field and landing place for aeroplane tourists. This announcement has been made by J. G. Vincent, vice president of engineering.

Aeroplanes will be received within a month and experiments will commence immediately thereafter, it is understood. As was said recently by President Henry B. Joy, the Packard company has become strongly interested in aviation affairs, and tests with the view of proving the value of the twelve cylinder motor for aeroplane use have been in progress for six months.

In anticipation of the greater use of the aeroplane for touring purposes, the field will be made available for the comfort and convenience of aeroplane tourists, and probably will be equipped with hangars, repair shops and supply stations, it is understood.

Experimental aeroplanes will be fitted with motors designed by the Packard engineering department and constructed at the Packard factory. The company does not contemplate the manufacture of complete aeroplanes, for the time being, at least, but will concentrate upon perfecting motors for aero use.

### MORE THAN EVER.

There are more cars in Harrison county than ever before and the number is still on the increase.

## GRAY WOLF IS GRAND OLD CAR

And Will Very Soon Be Seen on the Race Tracks Again.

The Gray Wolf, the Packing racing marvel of more than a decade ago, is limbering up its joint and may soon make its appearance on some of the dirt tracks.

Frank W. Ford, showman and automobile enthusiast of Dallas, Tex., owns the ancient relic, and he has written to the factory to obtain some spare parts. "I am going to put the Gray Wolf back in races again," writes Mr. Ford.

The Gray Wolf is the grand old car of the speedway. On January 3, 1904, it shattered existing world records and established new American records for cars of any weight or horse power. It broke the American one mile record no less than thirteen times in two days.

The Packard Gray Wolf was built during the year 1902, and was raced during the years of 1903 and 1904. The records established by the Gray speed chariot were made in competition with the best foreign cars and the best cars this country could produce all rated at greater horse power.

Its world's records, all hung up at Daytona Beach, were one kilometer, 29-2-5 seconds; one mile 46-2-5 seconds; five miles 4-21 3-5 minutes. These records appear somewhat

## BATTERY IGNITION

More Popular Than Ever Now and Three-Fourths of Cars Made Are Using It.

On account of the universal use of electric lighting and starting and also the use of eight and twelve cylinder motors, the battery ignition is becoming more popular than ever. This season shows that more than three-quarters of the cars use battery ignition. The magneto is found only on the high grade and more exclusive cars of the four and six cylinder variety. Up until quite recently no eight or twelve cylinder magneto was available, so manufacturers were forced to employ battery ignition. In fact, all the eight cylinder pioneers used this ignition and, finding it satisfactory, have continued to use it.

### DUSTLESS ROAD ARRIVES.

The dustless road is not only in sight, but is now known to be only a question of better highway engineering combined with the first outlay of capital necessary for the change from the use of dusty to dustless roads.

### NUMBER OF CARS SOLD.

A number of cars were reported sold by local agents during the week, which is going some for this time of the year. There is always something doing in the auto line in the Clarksburg district.

when compared with a sustained speed of 102 miles an hour made by J. G. Vincent with a Packard twin six at Sheephead Bay.

# Harrison County Auto & Garage Co.

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